

SYNOPSIS OF THE RUBIACEAE OF CHILE

SINOPSIS DE LAS RUBIACEAE DE CHILE

Charlotte M. Taylor*

ABSTRACT

The Rubiaceae of Chile comprise about forty species in nine genera [*Coprosma*, *Cruckshanksia*, *Galium* (including *Relbunium*), *Hedyotis*, *Leptostigma*, *Nertera*, *Oreopolus*, *Rubia*, *Sherardia*], three tribes (Anthospermeae, Hedyotideae, Rubieae), and one subfamily (Rubiodeae). Included here are both a natural and an artificial key to the genera and discussions of several genera and species and of excluded species doubtfully present in Chile or reported in error. This synopsis supplements the future Flora de Chile treatment.

KEYWORDS: Taxonomy, Rubiaceae, Chile, *Coprosma*, *Cruckshanksia*, *Galium*, *Hedyotis*, *Leptostigma*, *Nertera*, *Oreopolus*, *Rubia*, *Sherardia*.

INTRODUCTION

The Rubiaceae include about 10,000 species found throughout the world, classified in 650 genera and 44 tribes (Robbrecht 1988). The family is generally considered Gondwanan in origin (Raven & Axelrod 1974). The most recent subfamilial and tribal classification, that of Robbrecht (1988), is followed here. Andersson (1992) estimated that there are about 4,500 neotropical species of Rubiaceae, the majority of which are found in South America; this list included the Chilean species.

The Rubiaceae of Chile comprise about forty species in nine genera (Marticorena & Quezada 1985). One subfamily, Rubiodeae, and three of the twenty-seven tribes found in South

RESUMEN

La familia Rubiaceae en Chile incluye alrededor de cuarenta especies de nueve géneros [*Coprosma*, *Cruckshanksia*, *Galium* (incluido *Relbunium*), *Hedyotis*, *Leptostigma*, *Nertera*, *Oreopolus*, *Rubia*, *Sherardia*], tres tribus (Anthospermeae, Hedyotideae, Rubieae), y una subfamilia (Rubiodeae). Se presentan aquí una clave natural y una clave artificial para los géneros y discusiones de varios géneros y especies además de especies dudosamente de Chile o registradas en error. Esta sinopsis suplementa el tratamiento que se presentará en la Flora de Chile.

PALABRAS CLAVES: Taxonomía, Rubiaceae, Chile, *Coprosma*, *Cruckshanksia*, *Galium*, *Hedyotis*, *Leptostigma*, *Nertera*, *Oreopolus*, *Rubia*, *Sherardia*.

America, Anthospermeae, Hedyotideae, and Rubieae, are represented.

Although situated in South America, Chile is relatively isolated biologically from the rest of the continent by the high Andes to the east and the Atacama desert to the north (Rundel *et al.* 1991; Stuessy & Taylor 1995), and is dominated by desert, subtropical, and temperate climates distinct from those of most of the rest of the continent (Grau 1995). Consequently, its phyto-geographic affinities within South America are principally with the Andean floristic region, and overall its flora is Holantarctic rather than Neotropical (Taktajan 1986).

Below I present a natural and an artificial key to the genera of Rubiaceae in Chile, a synopsis of these genera, detailed discussions of several genera and species, and a detailed discussion of each of the species of Rubiaceae whose report from Chile is here considered doubtful or in error. These notes are intended to supplement the treatment that will be presented for the family in the Flora de Chile.

*Missouri Botanical Garden, P. O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

NATURAL KEY TO THE GENERA OF RUBIACEAE IN CHILE

1. Ovules two to numerous in each locule; fruit capsular (HEDYOTIDEAE).
 2. Placentas peltate, subsessile, with ovules numerous in each locule; capsules dehiscent at the apex into two valves but usually incompletely so.....*Hedyotis*
 2. Placentas prolonged perpendicularly to the septum in each locule to form a pseudoseptum, with ovules two per locule; capsule completely dehiscent into 2-5 valves.
 3. Stipules triangular or shallowly to completely bilobed, entire to strongly erose, separated by elongated internodes; leaves drying chartaceous to subcoriaceous, opposite or sometimes subopposite to alternate at more distal nodes; flowers subtended by simple or 3-7-lobed foliaceous bracts similar to the cauline leaves; calyx lobes 2-5, elliptic to obovate, subulate, or sometimes prolonged into stipitate petaloid appendages, usually enlarging in fruit; corolla pubescence similar in long-styled and short-styled forms; capsules acropetally dehiscent into 2-5 valves.....*Cruckshanksia*
 3. Stipules triangular, entire to shortly bifid, closely set or usually imbricated by the limited development of the internodes; leaves drying coriaceous, ternate or rarely opposite; flowers subtended by triangular membranaceous bracts smaller than but similar to the stipules; calyx lobes 5, triangular, never prolonged into petaloid appendages, not enlarging in fruit; corolla pubescence dimorphic in long-styled and short-styled forms; capsules basipetally dehiscent into 2 valves.....*Oreopolus*
1. Ovules solitary in each locule; fruit fleshy or dry, drupaceous or schizocarpous.
 4. Leaves paired, stipulate; fruit a leathery drupe (ANTHOSPERMEAE).
 5. Shrubs or trees, usually dioecious; inflorescences enclosed by a sheath of empty stipules or stipuliform bracts.....*Coprosma*
 5. Low or creeping herbs, with flowers hermaphroditic; flowers usually solitary, not enclosed by stipules or bracts.
 6. Calyx limb developed and lobed; fruits leathery.....*Leptostigma*
 6. Calyx limb lacking or reduced to a short entire ridge; fruit juicy.....*Nertera*
 4. Leaves whorled, 4-10 per node, apparently estipulate; fruit dry, drupaceous or schizocarpous (RUBIEAE).
 7. Inflorescences terminal or axillary at most distal 2-3 nodes, capitate, involucrate, the involucre bracts similar to vegetative leaves.....*Sherardia*
 7. Inflorescences axillary at many nodes, open-cymose or if capitate and involucrate then the involucre bracts reduced compared to vegetative leaves.
 8. Flowers in open cymes or partially to fully capitate or solitary; corollas rotate.....*Galium*
 8. Flowers in open cymes; corollas shortly funnelform.....*Rubia*

ARTIFICIAL KEY TO THE GENERA OF RUBIACEAE IN CHILE

1. Leaves whorled, 4-10 per node, apparently estipulate.
 2. Inflorescences terminal or axillary at most distal 2-3 nodes, capitate, involucrate, the involucre bracts similar to vegetative leaves; corollas salverform with tubes 3-4 mm long, pink or purple.....9. *Sherardia*
 2. Inflorescences axillary at many nodes (sometimes appearing terminal in *Galium antarcticum*), open-cymose or if capitate and involucrate then the involucre bracts reduced compared to vegetative leaves; corollas shortly funnelform to rotate with tubes 1 mm long or shorter, green, white, yellow, dull red, or pale pink.
 3. Flowers in open cymes or partially to fully capitate or solitary; corollas rotate, lobed nearly to base, green, white, yellow, dull red, or pale pink, 3-4-lobed.....7. *Galium*
 3. Flowers in open cymes; corollas shortly funnelform with tubes about 1 mm long, yellow, 5-lobed.....8. *Rubia*
1. Leaves paired or ternate or sometimes subalternate, at least some nodes with interpetiolar stipules or at least an interpetiolar line.
 4. Erect shrubs or small trees; Juan Fernández Islands or cultivated ornamentals.....4. *Coprosma*
 4. Erect or prostrate herbs or geophytes; continental Chile and Juan Fernández Islands, not cultivated.
 5. Prostrate herbs; fruit juicy, red to orange; calyx limb 0-0.5 mm long.....6. *Nertera*
 5. Erect or prostrate herbs, geophytes, or hemicryptophytes; fruit dry or leathery, green to brown; calyx limb 0.5 mm long or longer.
 6. Hemicryptophytes with internodes contracted, usually covered or nearly so by stipules; leaves ternate2. *Oreopolus*

6. Herbs or geophytes with the internodes relatively expanded, longer than the stipules; leaves opposite or sometimes subalternate.
7. Calyx lobes 3.5-22 mm long, often strongly unequal and/or one or more bearing a petaloid appendage; inflorescence bracts similar in size to vegetative leaves, 3-7-lobed.....1. *Cruckshanksia*
7. Calyx lobes 0.5-2 mm long, subequal, unappendaged; inflorescence bracts triangular to linear, minute or 1-4 mm long, and not resembling vegetative leaves.
8. Leaves 3-35 mm wide, with 3-5 pairs of secondary veins evident, with margins scabrous-ciliate; fruit drupaceous with two planoconvex pyrenes 3-4 mm long.....5. *Leptostigma*
8. Leaves 1.5-5 mm wide, with secondary veins not evident, with margins smooth and glabrous; fruit capsular with numerous seeds 0.2-0.3 mm long.....3. *Hedyotis*

I. HEDYOTIDEAE Cham. & Schltdl.

This pantropical tribe also includes numerous temperate species, most of them in *Hedyotis* L. (sensu lato; see discussion below).

1. *Cruckshanksia* Hook. & Arn.

This genus has been studied in some detail by Ricardi (1963b) and Ricardi & Quezada (1963), who recognized seven species. Its delimitation from *Oreopolus* Schltdl. has been controversial, and two species treated by Ricardi (1963a) in this genus, "*O. macranthus* (Phil.) Ricardi" and "*O. palmae* (Clos) Ricardi", are here treated in *Cruckshanksia* (Taylor, 1996). *Cruckshanksia* is endemic to the deserts and Andean cordillera of northern Chile and adjacent Argentina. Aside from its close relationship to *Oreopolus*, the affinities of this genus within the tribe are not clear.

2. *Hedyotis* L.

Together with *Houstonia* L. and *Oldenlandia* L., *Hedyotis* forms a complex of herbaceous species found throughout the world in both tropical and temperate regions. Most authors have found the delimitation of these genera difficult (e.g., Gray 1860; summary in Terrell 1991), and several different arrangements have been propo-

sed. These genera have been studied recently in the Americas by Terrell *et al.* (1986) and Terrell (1990, 1991), who most recently recognized six genera for the North American species that were studied. Some authors have taken a comprehensive view and included all of the species in one genus, *Hedyotis* (e.g., Fosberg 1943; Marticorena & Quezada 1985).

This group is represented in Chile by two species, one frequently collected and widespread in the Americas, *Hedyotis salzmannii* (DC.) Steud., and the other infrequently found and poorly known, *H. brachypetala* Phil. *Hedyotis salzmannii* is also found in North America. Terrell most recently treated it (1990, 1991) as *Oldenlandia salzmannii* (DC.) Benth. with the note that although its seed characters and chromosome numbers differ from what he considered "strictly oldenlandioid", it was "tentatively retained here [in *Oldenlandia*] pending further study". Because of the incomplete review to date available for the *Hedyotis-Oldenlandia* complex, the uncertain position of *H. salzmannii* within it, and the consequent instability of nomenclature in this group, a conservative approach is adopted here and these species are both treated in *Hedyotis*.

A detailed description is presented here for *Hedyotis brachypetala*, which has not been recognized by recent authors, but not for *H. salzmannii*, which is well known. For a description and illustration of the latter species, see Bacigalupo (1965).

KEY TO SPECIES OF *HEDYOTIS* IN CHILE

1. Peduncles 0-0.5 mm long; ovary and fruit glabrous; calyx lobes deltoid to narrowly triangular, 0.3-1 mm long in flower and fruit.....*H. brachypetala*
1. Peduncles 2-9 mm long; ovary and fruit glabrous or usually at least sparsely pilose; calyx lobes lanceolate to narrowly triangular, 1.2-2 mm long in flower, elongating to 3 mm long in fruit.....*H. salzmannii*

Hedyotis brachypetala Phil., Anales Univ. Chile 85: 740. 1895.

TYPE: Prope Quillem en Araucania, legi locis humidis novembri 1887, *Philippi s.n.* (holotype: SGO n.v.).

Hedyotis minuta Phil. ex Benth. & Hook., Gen. Pl. 2: 58. 1873. nom. nud.

Annual or perhaps perennial, glabrous herbs; stems prostrate, rooting at nodes, with flowering stems to 2 cm long. Leaves sessile, 3-5 mm long, 1-2 mm wide, elliptic to oblanceolate, at apex obtuse to rounded, at base acute, subcoriaceous, with costa but no other venation evident, margins entire; stipule sheath 0.1-0.4 mm long, deltoid, entire to shortly 2-4-fimbriate. Flowers solitary, terminal and pseudoaxillary (by overtopping), sessile; hypanthium turbinate to hemispherical, ca. 1 mm long, glabrous; calyx limb glabrous, divided to base, lobes 4, deltoid to narrowly triangular, 0.3-1.2 mm long, acute; corolla tubular, white, glabrous throughout, ca. 1 mm long overall, lobes 4, deltoid, united at base into a tube ca. 0.2-0.3 mm long; anthers 0.2-0.3 mm long, partially exerted; style and stigma not seen. Fruits sessile to subsessile with peduncles elongating to ca. 0.5 mm long, subglobose to ellipsoid, 1.5-2 mm in diameter, slightly didymous, somewhat flattened laterally, with beak ca. 0.2 mm long and broadly rounded; mature seeds not seen.

Specimens Examined. CHILE. VIII Región: Prov. Biobío: Cordillera de Chillán, 1856 & 1857, P. Germain s. n. (K); Santa Julia, Jan. 1896, F. W. Neger s.n. herb. Gunckel 13172 (CONC-117244); Cordillera de Chillán, Philippi s.n. (NY).

Reiche (1900) reported that the type of this species was missing, and it still has not been located. However, the original description clearly identifies it and separates it from *Hedyotis salzmännii*, although because it is so rarely collected it has been regarded as dubious (cf. Marticorena & Quezada 1985). Reiche (1900) suggested that this name was a synonym of the earlier name *H. inconspicua* F. Phil., but examination of the type of that name shows that it is a synonym of *H. salzmännii*.

Hedyotis salzmännii (DC.) Steud., Nomencl. Bot. ed. 2, 1: 728. 1840. *Anotis salzmännii* DC., Prodr. 4: 433. 1830. *Oldenlandia salzmännii* (DC.) Benth. & Hook. f. ex B.D. Jackson, Index Kew. 2: 336. 1894. TYPE: Brazil, Bahía, *Salz-*

mann s.n. (holotype: G-DC, microfiche!).

Hedyotis uniflora DC., Prodr. 4: 421. 1830, nom. illeg. not *Hedyotis uniflora* Lam., Tabl. encycl. 1: 272. 1792. [And not *Oldenlandia uniflora* L., Sp. Pl. 1: 119. 1753.]. TYPE: Chile, ad ripis torrentum in locis sabulosis herbis Taguatagua, Oct. 1828, D. Bertero 319 (holotype: G-DC, microfiche!; isotypes: F!, GH!, NY!).

Spermacoce? [sic] *oldenlandiae* DC., Prodr. 4: 557. 1830. [Based on *Oldenlandia uniflora* sensu Ruiz & Pavón, Fl. Peruv. 1: 57. 1798, not *Oldenlandia uniflora* L., Sp. Pl. 1: 119. 1753.]. TYPE: In Chili locis humidis et scarturignibus prope Concepcion urbem, ad Nonguen, Andalien et Palomares tractus, Ruiz & Pavón.

Hedyotis muscosa A. St.-Hil., Voy. Dist. Diam. 2: 396. 1833. TYPE: Brazil, inveni in arenosis, ad fauces fluminis Tramandahy, provincia Rio Grande do Sul, et in cespitosis humidis ad ripas fluminis Rio de la Plata, prope urbem Colonia del Sacramento.

Hedyotis thesiifolia A. St.-Hil., Voy. Dist. Diam. 2: 397. 1833. *Oldenlandia thesiifolia* (A. St.-Hil.) K. Schum. in Mart., Fl. Bras. 6(6): 269, t. 127, fig. 1. 1889. TYPE: Brazil, in paludibus prope urbem Murgi das Cruzes, prov. S. Pauli.

Hedyotis perpusilla Hook. & Arn., Bot. Misc. 3: 359. 1833. TYPE: Argentina, shores of La Plata near Buenos Aires, *Tweedie s.n.* (holotype: K!).

Hedyotis pilosa Poepp. in Poepp. & Endl., Nov. Gen. Sp. Pl. 3: 30, t. 235. 1841. *Hedyotis uniflora* DC. var. *pilosa* (Poepp.) Reiche, Anales Univ. Chile 106: 968. 1900. TYPE: Chile, Concepción, near Talcahuano, *Poeppig s. n.* (holotype: B, destroyed).

Hedyotis palustris Casar. ex K. Schum. in Mart., Fl. Bras. 6(6): 269. 1889, nom. nud. pro syn.

Hedyotis dasycarpa Kunze, [Pl. Poeppig Chile Coll, 3: 44, nom. ined, in sched.]; ex K. Schum. in Mart., Fl. Bras. 6(6): 269. 1889, nom. nud. pro syn.

Hedyotis chiloensis Phil., Linnaea 28: 697. 1858. TYPE: Chile, prope Calbuco, *Philippi s.n.* (holotype: SGO-56924!).

Hedyotis inconspicua F. Phil., Anales Univ. Chile 85: 739. 1895. *Oldenlandia inconspicua* (F. Phil.) Reiche, Anales Univ. Chile 106: 960. 1900. TYPE: Chile, Talca, in valle andina fluminis río Claro, Paleria, 15 Feb. 1879, F. Philippi s.n. (holotype: SGO-56926!; isotype: SGO-43313!).

This low herb is found widely in open moist to wet microsites in southern Chile and the Juan Fernandez Islands (Masatierra) at 0-2,000 m. It is also found in northeastern Argentina, southern Brazil, Paraguay, and Uruguay and additionally in the southeastern United States, where it is apparently introduced and naturalized (Terrell 1990). In Chile it is usually found in flower and fruit concurrently from November through February, and sporadically at other times of the year depending on local conditions. Its breeding biology and floral morphology (*Hedyotis salzmanii* is distylous) have been studied by M. Riveros (Universidad Austral de Chile, Valdivia). Skottsberg (1921) discussed the arrival or introduction of this species on Masatierra Island, but his analysis was limited by lack of knowledge of how this species disperses.

Bentham & Hooker (Gen. Pl. 2: 58. 1873) noted that in their system of classification, *Anotis salzmanii* DC. should be included in *Hedyotis*. They did not explicitly make this combination, however, and thus according the Art. 33.1 of the International Code of Botanical Nomenclature they did not validly publish the name that was included in the Index Kewensis, and its publication must be ascribed to Jackson in that work.

Ruiz and Pavón applied the name "*Oldenlandia uniflora*" to a species they found in Chile, with an explicit reference to Linnaeus's name *O. uniflora* and clearly intending to cite the same species he described from Virginia. The name "*O. uniflora* Ruiz & Pavón" has been cited by other authors and several varieties of it were described by Reiche (1900), but Ruiz and Pavón never intended to publish this name, which at any rate would have been an invalid later homonym of Linnaeus's name. De Candolle recognized that Ruiz and Pavón's plant was actually different from Linnaeus's species and therefore required a new name. He provided two of them, apparently inadvertently: both *Hedyotis uniflora* and *Spermacoce? oldenlandiae* were published with a reference to "*O. uniflora*" of Ruiz and Pavón. *Anotis salzmanii* was also published in that same work, but without reference to Ruiz and Pavón's species.

St.-Hilaire also simultaneously published two different names that are now considered synonymous, *Hedyotis thesiifolia* and *H. muscosa*. Schumann first recognized their synonymy, and selected the epithet "*thesiifolia*".

The strongly pilose variant of this species that was named *Hedyotis pilosa* by Poeppig has not been seen again, even among the numerous living populations still found in and around Concepción (pers. obs.).

3. *Oreopolus* Schldl.

This genus was reviewed by Ricardi (1963b, 1968, 1973), who separated the distinctive species *Oreopolus glacialis* (Poepp.) Ricardi from *Cruckshanksia* along with two additional species, "*O. macranthus*" and "*O. palmae*". These last two species are here treated in *Cruckshanksia* (Taylor, 1996). *Oreopolus glacialis* is found from Tierra del Fuego north to near Santiago in the Andean cordillera of Chile and Argentina. Aside from its close relationship to *Cruckshanksia*, the affinities of this genus within the tribe are not clear.

II. ANTHOSPERMEAE Cham. & Schldl.

This tribe is characteristic of the southern hemisphere, and the species of Anthospermeae found in Chile apparently all have affinities with species of the South Pacific region.

4. *Coprosma* J. R. Forst. & G. Forst.

This genus is widespread in the Pacific islands, with numerous species in New Zealand and Australia. It is represented in Chile by two native species, *Coprosma oliveri* Fosberg and *C. pyriformis* (Hook. & Arn.) Skotts., both endemic to the Juan Fernandez Islands (Fosberg 1968). One other species native to New Zealand, *C. repens* A. Rich. (synonyms: *C. baueriana* Hook. f. and *C. retusa* Hook. f.; also sometimes incorrectly identified in cultivation as "*C. baueri*") is widely cultivated for its shining, sometimes variegated foliage, particularly in maritime south-central Chile. It can be separated from the native species by its dense globose inflorescences of 5-15 flowers and oblong leaves with rounded to truncate apices, vs. flowers 1-3 in contracted cymes and leaves elliptic to lanceolate or ovate with acute to attenuate apices.

5. *Leptostigma* Arn., J. Bot. (Hooker) 3: 270. 1841. Type: *Leptostigma arnottianum* Walp.

This genus comprises six species found in Australia (1 species), New Zealand (1 species).

lowland southern Chile (1 species), and high elevations in the tropical Andean Cordillera (3 species) (Fosberg, 1982).

Leptostigma arnottianum Walp., [Repert. Bot. Syst. 2: 463. 1843, nom. nud.]; Repert. Bot. Syst. 6: 26. 1846. *Nertera arnottiana* (Walp.) Rob., Proc. Amer. Acad. Arts 45: 408. 1910. TYPE: Chile, Prov. Valdivia, fields near Valdivia. *Bridges* 762 (holotype: K n.v.).

Hedyotis repens Clos in Gay, Fl. Chil. 3: 208. 1848. *Coprosma calycina* A. Gray, Proc. Amer. Acad. Arts. 4: 306. 1860, nom. nov., not *Coprosma repens* A. Rich. in Lesson & A. Rich., Voy. Astrolabe, Bot. 1: 264. 1832. "*Oldenlandia uniflora* Ruiz & Pavón" var. *repens* (Clos) Reiche, Anales Univ. Chile 106: 968. 1900, nom. illeg. TYPE: Chile, Prov. Valdivia, Osorno et Valdivia, Feb. 1835, *C. Gay 1008* [lectotype, here designated: P n. v., photos (Rockefeller neg. #37302) GH!, UC! (no neg. #) SGO-56906!]. [Note: Reiche's varietal name is illegitimate because the species name to which it was transferred as a variety is illegitimate; see discussion under *Hedyotis salzmännii*, above].

This species is endemic to fields and forest understory, particularly in wet microsites, at 0-1000 m in south-central Chile. Ramírez & Alberdi (1978) detail the life cycle of this species near Valdivia, and note that it is one of the relatively few native Chilean plant species that has thrived in human-altered environments in this region.

Fosberg's description (1982) of the stipules as a "collar" apparently refers to the persistent basal portion of the interpetiolar sheath found on nodes from which the leaves have fallen; the stipules of this species are subtruncate, interpetiolar, and fused to the petioles, and do not extend intrapetiolarly to unite into a continuous sheath around the stem as in the "collar" of some other Rubiaceae. Although he described the flowers as solitary in the genus description, Fosberg correctly noted in the species description that the inflorescences of *Leptostigma arnottianum* frequently have two or three flowers in a group.

Two collections at P, *Gay 1003* from Daglipulli, Jan. 1835, and *Gay 1008*, were annotated by Clos as *Hedyotis repens*. These both represent the same species; the second collection is chosen as the lectotype here based on the more numerous photographs available of it.

6. *Nertera* Banks & Sol. ex Gaertn., Fruct. Sem. Pl. 1: 124. 1788, nom. cons. Type: *Nertera depressa* Banks & Sol. ex Gaertn. = *Nertera granadensis* (L. f.) Druce.

Nerteria Smith, Pl. Icon. Ined. 2: 28. 1790, orth. var.

Gomozia Mutis ex L. f., Suppl. Pl. 17. 1782, nom. rej. Type: *Gomozia granadensis* Mutis ex L. f. = *Nertera granadensis* (Mutis ex L. f.) Druce.

Cunina Clos in Gay, Fl. Chil. 3: 201. 1848. Type: *Cunina sanfuentesii* ("Sanfuentes") Clos.

This genus comprises one widespread and rather variable species, which is found from the southernmost Andean Cordillera north through the Central American highlands to southern Mexico, in the Juan Fernandez Islands (Masafuera), New Zealand, Australia, Java, and Madagascar, and at low elevations in southern Chile. Formerly more species were included in this genus, but they have been recently transferred to *Leptostigma* (Fosberg 1982).

Nertera granadensis (Mutis ex L. f.) Druce, Bot. Soc. Exch. Club Brit. Isles 1916: 637. 1917. *Gomozia granadensis* Mutis ex L. f., Suppl. pl. 129. 1782. TYPE: Colombia, *Mutis*.

Nertera depressa Banks & Sol. ex Gaertn., Fruct. Sem. Pl. 1: 124, t. 26, fig. 1. 1788. TYPE: Habitat in regionibus antarctis, ex herbario Bankiano.

Nertera repens Ruiz & Pavón, Fl. Peruv. 1: 60, t. 90, fig. B. 1798, nom. illeg., nom. superfl. [Note: Ruiz & Pavón cited both of the previously published names *Gomozia granadensis* and *Nertera depressa* as synonyms of their *N. repens*, and explained that their intent was to replace the epithet "depressa" with the more appropriate description "repens".]

Cunina sanfuentesii ("Sanfuentes") Clos in Gay, Fl. Chil. 3: 203, lm. 34. 1848. TYPE: Chile, Valdivia, Jan. 1835, *C. Gay 392* (lectotype, here designated: P n. v., photo SGO!).

This species is found in wet formations and microsites in south-central to extreme southern Chile. It is generally collected in flower and fruit concurrently from October through January, and may reproduce sporadically at other times of the year depending on local conditions.

Clos distinguished *Cunina* based on its unusual fruits, which he interpreted as having a hard central globose core with a rugose covering and a single membranaceous wing encircling it. Howe-

ver, the fruit he observed is a typical juicy drupaceous fruit of *Nertera granadensis* that was fully mature when collected, and the swollen thin-textured pericarp was flattened and become black when dried. Two collections at P, *Gay 1007* from near Valdivia, Feb. 1834, and *Gay 392*, were annotated by Clos as *C. sanfuentesii*. These both represent the same species; the second collection is chosen as the lectotype here based on its somewhat better condition. Clos named this species in honor of Salvador Sanfuentes, a governor of Valdivia and later minister of justice and public education for Chile.

III. RUBIEAE

This tribe is cosmopolitan.

7. *Galium* L. [including *Relbunium* (Endl.) Benth.]

The Chilean species of this genus have all been treated in detail in the monographic work of Dempster (1980, 1981, 1982, 1990, 1993). She reports twenty-five species from Chile, most of them native; about half of the native species are endemic to Chile, while the others are shared with Argentina and sometimes also with other Andean countries.

Galium Section *Relbunium* Endl. was elevated to the rank of genus by Bentham and Hooker and many subsequent authors (e.g., Bacigalupo 1965) based on its involucrate inflorescences and "usually" carnosely fruits, but is included in *Galium* by Dempster. She noted (1982, 1990) that carnosely fruits are principally found in one species with involucrate inflorescences, *G. hypocarpium* (L.) Griseb., but are also present in various other species of *Galium* that completely lack involucre. She detailed the variation found in involucrate inflorescences, from species in which each flower is usually sessile above its own involucre to those in which the inflorescence proliferates above one or more involucre, and concluded that separating one group of these as *Relbunium* is arbitrary and sometimes subject to the interpretation of the "ideal" inflorescence of a given species, and therefore is not meaningful in systematic terms.

8. *Rubia* L.

This genus is represented in Chile by one introduced species, *Rubia tinctorum* L., which is

probably native to the eastern Mediterranean region (Ball 1976). It has been widely cultivated there and elsewhere for its roots, which produce a red dye called madder, and occasionally persists or becomes naturalized after cultivation. In Chile this species has been reported as persistent from cultivation and perhaps naturalized near Santiago (Reiche 1900). It has been collected in flower in November and December; plants with fruit have apparently not been seen in Chile.

9. *Sherardia* L.

This monotypic genus is native to Eurasia, but *Sherardia arvensis* L. is today widely naturalized as a weed in temperate regions and in montane tropical South and Central America, though it is often overlooked because of its small size. It is frequent in disturbed sites, cultivated fields, and lawns in south-central Chile, and generally flowers and fruits concurrently from October through February.

EXCLUDED SPECIES

Names in *Galium*, *Cruckshanksia*, and *Oreopolus* are not included here; consult the treatments of those particular groups, noted above.

Arcytophyllum laricifolium (Cav.) W. H. Lewis, Ann. Missouri Bot. Gard. 53: 110. 1966. *Hedyotis laricifolia* Cav., Icon. 6: 54, t. 575, fig. 1. 1801. TYPE: "In altissimus montibus Regni Chilensis vulgo Cordillera," Jan., *Née s.n.* [holotype: MA n. v., photos (Rockefeller neg. #29612) F! GH!, photo (no neg. #) NY!].

This species was purportedly described from Chile, and was included by Clos (1848) in his list for the country. However, the identity and collection locality of this plant are not well known. Lewis published only a nomenclatural combination in *Arcytophyllum*, without any additional comment. The photograph of the full sheet of the Ne collection at MA on which this name is based (photo at NY) was treated tentatively as *Arcytophyllum filiforme* (Ruiz & Pavón.) Standl. by Mena (in herb.), while the close-up photographs of the same collection (photos at F and GH) were treated tentatively as *A. thymifolium* (Ruiz & Pavón.) Standl. by Mena (in herb.; 1990). Some of these photographs along with the other Ne specimen discussed below probably

form the basis for Mena's unreferenced comment about unsubstantiated reports of *A. thymifolium* from Chile (see the discussion of *A. thymifolium*, below). Mena concluded that *Hedyotis laricifolia* is not a species of *Arcytophyllum* based on the apparently herbaceous habit and axillary inflorescences of the plant depicted in Cavanilles's figure. However, this figure is somewhat diagrammatic, and the habit of the plant could equally well be interpreted as slenderly woody. The inflorescences in this figure are clearly terminal rather than axillary, although each is depicted as overtopped by growth from both of the subtending axillary buds.

The photographs of the presumed type specimen at MA show a plant with a clearly woody base and a few old capsules borne in the same position as shown in Cavanilles's figure. Although this specimen was said to be from Chile, the collection localities for Née's specimens are sometimes unreliable (Stafleu & Cowan 1981), and it may actually have been collected in Peru or further north.

Arcytophyllum thymifolium (Ruiz & Pavón.) Standl., Publ. Field Columbian Mus., Bot. Ser. 7: 40. 1930. *Hedyotis thymifolia* Ruiz & Pavón., Fl. Peruv. 1: 56. 1798. TYPE: Peru. "In collibus Tarma et Cajatambo," Ruiz & Pavón s.n. label # 12/86 (holotype: MA n.v., photo NY n.v.).

This species is widely distributed at high elevations in the Andes from Colombia to Peru, but Mena (1990) noted that reports of its occurrence in Chile, which he did not cite, are not supported by specimens and are apparently in error. A Née specimen at MA [photo (Rockefeller neg. #29650) MO!] with ample flowers and fruits, which is identified with the nomen nudum "*Hedyotis hyssopifolia* Cav." but clearly represents *Arcytophyllum thymifolium*, is said to be from "Chile, Coquimbo" but most likely is not, as noted above.

Polypremum schlechtendahlil Walp. in Meyen, Observ. Bot. 350. 1943, nom. nov., based on *Polypremum procumbens* Schldl., nom. ined. (in sched.?), not *Polypremum procumbens* L., Sp. Pl. 111. 1753. TYPE: Not designated.

This species was cited by Walpers (1843) from Veracruz, Mexico and the Cordillera de San Fernando, Chile, based on Meyen's collections, and was included by Clos (1848) in the Rubia-

ceae of Chile. This genus is not otherwise known from Chile (Marticorena & Quezada 1985). *Polypremum* has been treated by more recent authors in the Loganiaceae (Cronquist 1981), and both this genus and the problem of the identity of Meyen's plant are here referred to that family.

Sipanea erythraeoides Cham., Linnaea 9: 242. 1834.=*Limnosipanea erythraeoides* (Cham.) K. Schum. in Mart., Fl. Bras 6(6): 253. 1889.

This species was reported from Chile by Walpers (1843) based on a specimen collected by Meyen in the Cordillera de San Fernando at 2000-3000 m elevation. Meyen's collections were deposited at B (Stafleu & Cowan 1981) and therefore lost when this collection was destroyed during World War II. Schumann cited Meyen's collection in his treatment of *Limnosipanea erythraeoides* with the comment that it might be a variant of some other species. Steyermark (1967) cited the geographic distribution of this species only as "southern Brazil." The disjunct occurrence of one species of *Limnosipanea*, a genus of low herbs otherwise known only from moist to wet lowland tropical life zones in eastern South America, in the cool Mediterranean-type climate region of the high Chilean Andes is unexpected, and seems doubtful. The identity of the plant that Meyen collected unfortunately cannot be evaluated in more detail.

Tepesia C. F. Gaertn., Suppl. Carp. 1(2): 72. 1806. Type: *Tepesia dubia* C. F. Gaertn., Suppl. Carp. 1(2): 73, t. 192, fig. 6. 1806. TYPE: "ex dono amicissimi Dni DECANDOLLE e collectione L'HERITIER sub nomine *Petesiae*. Habitat in Chili?"

This plant was described by Gaertner as possibly from Chile, and reported as poorly known and doubtfully from there by Clos (1848). *Tepesia* was considered synonymous with *Hamelia* Jacq., a shrubby tropical genus, by Elias (1976). He concluded that Gaertner's plant represented an unusual *Hamelia* with a "four-parted corolla and fruit," and did not place *Tepesia dubia* in synonymy with any particular species of *Hamelia*. Gaertner did not mention the corolla in his description, but did describe and illustrate a four-parted calyx limb, and illustrated the ovary as four-locular. He described the fruit as baccate containing a soft pulp and numerous seeds, which does not describe the fruits of any species

of Rubiaceae presently known from Chile. L'Heritier remained in France during his entire life, and his own collections were all made from plants growing in and near Paris. Some of these plants were grown from seeds sent by field collectors from various parts of the world (Stafleu & Cowan 1981), and it seems likely that in this case the original collection locality of the seeds, which was considered doubtful, is incorrect.

ACKNOWLEDGEMENTS

I thank C. Marticorena, M. Muñoz, and R. E. Gereau for their help and comments, and A. Pool for comments and particularly bibliographic assistance.

LITERATURE CITED

- ANDERSSON, L. 1992. A provisional checklist of neotropical Rubiaceae. *Scripta Bot. Belg.* 1: 1-199.
- BACIGALUPO, N.M. 1965. Rubiaceae. *In*: A. L. CABRERA, ed. Flora de la Provincia de Buenos Aires. Part IV (5a), pp. 342-375. Colección Científica del Instituto Nacional de Tecnología Agropecuaria, Secretaría de Estado de Agricultura y Ganadería de Argentina, Buenos Aires.
- BALL, P.W. 1976. *Rubia*. P. 38 *In*: D.H. VALENTINE & A.O. CHATER, eds., Rubiaceae. Pp. 3-38 *In*: T.G. TUTIN, V.H. HEYWOOD, N.A. BURGESS, D.M. MOORE, D.H. VALENTINE, S.M. WALTERS, & D.A. WEBB, Flora Europaea. Volume 4, Plantaginaceae to Compositae (and Rubiaceae). Cambridge University Press, Cambridge.
- CLOS, D. 1848. Rubiacées. *In*: C. GAY, Fl. Chil. 3: 176-212, lám. 32.
- CRONQUIST, A. 1981. An Integrated System of Classification of Flowering Plants. Columbia University Press, New York.
- DEMPSTER, L.T. 1980. The genus *Galium* Sect. *Lophogalium* (Rubiaceae) in South America. *Allertonia* 2(4): 247-278.
- _____. 1981. The genus *Galium* (Rubiaceae) in South America. II. *Allertonia* 2(8): 393-426.
- _____. 1982. The genus *Galium* (Rubiaceae) in South America. III. *Allertonia* 3(3): 211-258.
- _____. 1990. The genus *Galium* (Rubiaceae) in South America. IV. *Allertonia* 5(3): 283-344.
- _____. 1993. *Galium reynoldsii* equated with *G. galapagopense* Wiggins. *Madroño* 40(4): 265-266.
- ELIAS, T. S. 1976. A monograph of the genus *Hamelia* (Rubiaceae). *Mem. New York Bot. Gard.* 26: 81-155.
- FOSBERG, F. R. 1943. The Polynesian species of *Hedyotis* (Rubiaceae). *Bernice P. Bishop Mus. Bull.* 174. 102 pp.
- _____. 1968. Studies in Pacific Rubiaceae: VI-VII. *Brittonia* 20: 287-294.
- _____. 1982. A preliminary conspectus of the genus *Leptostigma* (Rubiaceae). *Acta Phytotax. Geobot.* 33: 73-83.
- GRAU, J. 1995. Aspectos geográficos de la flora de Chile. *En* C. MARTICORENA y R. RODRIGUEZ (eds.), Fl. Chile 1: 63-83.
- GRAY, A. 1860. Notes upon some Rubiaceae collected in the South Sea Exploring Expedition under Captain Wilkes. *Proc. Amer. Acad. Arts* 4: 306-318.
- MARTICORENA, C. & M. QUEZADA. 1985. Catálogo de la flora vascular de Chile. *Gayana, Bot.* 42: 1-157.
- MENA, P. 1990. A revision of the genus *Arcytophyllum* (Rubiaceae: Hedyotideae). *Mem. New York Bot. Gard.* 60: 1-26.
- RAMIREZ, C. & M. ALBERDI R. 1978. Ciclo anual de desarrollo de *Leptostigma arnotianum* Walpers (Rubiaceae) en la provincia de Valdivia, Chile. *AgroSur* 6(1): 14-23.
- RAVEN, P. H. & D. I. AXELROD. 1974. Angiosperm biogeography and past continental movements. *Ann. Missouri Bot. Gard.* 61: 539-673.
- REICHE, K. 1900. Estudios críticos sobre la flora de Chile. *Anales Univ. Chile* 106: 965-1048.
- RICARDI, M. 1963a. Rehabilitación del género *Oreopolus* Schlecht. *Gayana, Bot.* 6: 3-16.
- _____. 1963b. Una nueva especie de *Cruckshanksia* (Rubiaceae). *Gayana, Bot.* 7: 3-7.
- _____. 1968. Nota sobre *Oreopolus* (Rubiaceae). *Revista Fac. Ci. Agrar. Univ. Nac. Cuyo* 13(1-2): 3-7.
- _____. 1973. Addenda al género *Oreopolus* (Rubiaceae). *Bol. Soc. Biol. Concepción* 46: 217-221.
- RICARDI, M. & M. QUEZADA. 1963. El género *Cruckshanksia* (Rubiaceae). *Gayana, Bot.* 9: 3-36.
- ROBBRECHT, E. 1988. Tropical woody Rubiaceae. *Opera Bot. Belg.* 1: 1-271.
- RUNDEL, P. W., M. O. DILLON, B. PALMA, H. A. MOONEY, S. L. GULMAN, JR., & J. R. EHLERINGER. 1991. The phytogeography and ecology of the coastal Atacama and Peruvian deserts. *Aliso* 13: 1-49.
- SKOTTSBERG, C. 1921. The phanerogams of the Juan Fernandez Islands. *The Natural History of Juan Fernandez and Easter Islands* 2: 95-240. *Almqvist & Wiksells Boktryckeri-A.-B., Uppsala.*
- STAFLEU, F. A. & R. S. COWAN. 1981. Taxonomic Literature - II. Volume 3: Lh-O. *Regnum Veg.* 105: 1-980.
- STEYERMARK, J. A. 1967. *Limnosipanea*. *In*: B. Maguire & Collaborators. The botany of the Guiana highland-Part VII. *Mem. New York Bot. Gard.* 17: 282-284.
- STUESSY, T. F. & C. M. TAYLOR. 1995. Evolución de la flora de Chile. *En* C. MARTICORENA y R. RODRIGUEZ (eds.), Fl. Chile 1: 85-118.
- TAKHTAJAN, A. 1986. Floristic Regions of the World. University of California Press.

- TAYLOR, C.M. 1996. Taxonomic revision of *Cruckshanksia* and *Oreopulus* (Rubiaceae: Hedyotidae). *Ann. Missouri Bot. Gard.* 83: 459-477.
- TERRELL, E. E. 1990. Synopsis of *Oldenlandia* (Rubiaceae) in the United States. *Phytologia* 68: 125-133.
- . 1991. Overview and annotated list of North American species of *Hedyotis*, *Houstonia*, *Oldenlandia* (Rubiaceae) and related genera. *Phytologia* 71: 212-243.
- TERRELL, E. E., W. H. LEWIS, H. ROBINSON, J. W. NOWICKE. 1986. Phylogenetic implications of diverse seed types, chromosome numbers, and pollen morphology in *Houstonia* (Rubiaceae). *Amer. J. Bot.* 73: 103-115.
- WALPERS, W. G. 1843. Rubiaceae. *In*: F. J. F. Meyen, *Observationes botanicas. Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur.* 19, Suppl. 1: 349-357.